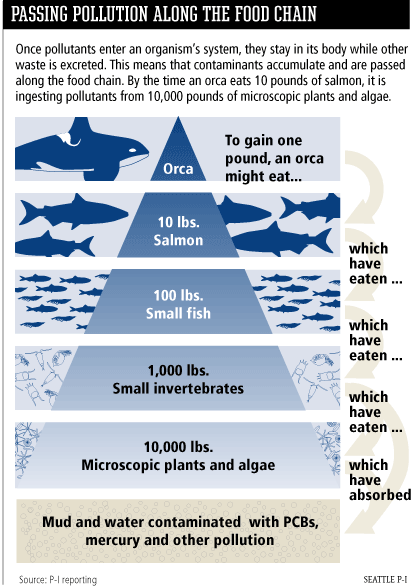
Wirth – Individual Project 2

Example 1: Chemicals, such as flame retardants, are showing up in the marine life of the Puget Sound. Flame retardants are used in a variety of products such as seat cushions and mattresses, and variety of other products break down into a fine powdered dust, in homes and RVs, that eventually makes its way into the water system of the Sound which as an estuary where fresh and salt water meet. Build up of these chemicals are showing up in marine life in high concentrations as they are consumed through the food chain. It is of great concern that these will become the number one killer of Orca whales in the next twenty years. This graphic shows how concentrations at the lowest level of the food chain affect the Orca. (Seatlepi, 2006)



Scientists are monitoring the levels of these chemicals by capture and release of harbor seals and hope to have more information about where these chemicals are coming from as they continue to study the area.

Example 2: Human ecology and the northern Alaska marine ecosystem - subsistence hunting and beluga populations in northern Alaska.

For thousands of years, the native peoples of Alaska have hunted beluga whales for a variety of uses and it still supplies a large part of the food supply in rural Alaska. The people of the northern part of Alaska, who harvest beluga whales, have been able to do so in a sustainable way. Currently, populations of belugas in that area are not in danger of reduction. Partly because these beluga populations are very mobile, genetically diverse, and native hunts are regulated through careful practice. In this way, there is a positive effect on the beluga populations.

Example 3: By contrast, human ecology has drastically reduced beluga populations in the Cook Inlet, an estuary on the southern side of Alaska. Here, unregulated hunts, boat traffic, pollution, and even noise have drastically reduced the beluga population to critical numbers. It is estimated that the current beluga population as of 2009, has shrunk to 321 this (International Polar Foundation, 20010).This particular population is genetically and geographically isolated from other belugas, which also inhibits their breeding capacity. Because the Cook Inlet is the busiest watershed in Alaska and one rich in the oil and gas industry, more than just belugas are suffering. The ecology of the inlet is subject to drastic changes because of spills form shipping vessels, runoff from the land, and sewage release – among other things (Defenders of Wildlife, 2008). Run off with fine sediment from glacially fed rivers and streams rush into the Inlet every summer making the water opaque and harder for the whales to navigate. Human causes of pollution kill off the smaller marine life that the belugas feed on. Sewage in particular, increases the amount of plant growth which decomposes and depletes oxygen levels in the water. Scientists are not sure of any one particular reason why the beluga population is in such a critical state, but they do maintain that the combination of all the factors previously mentions, will result in total extinction of this population if nothing is done. This could result in a domino effect of other species since the belugas of Cook Inlet are at the top of the food chain in that area. So far, there are strict hunting regulations in place and there is a push to establish a critical habitat area in the inlet that would include areas where the beluga feed and breed.

**Ecologically speaking, in what way(s) is this interconnection between the systems essential for their existence?** At this point, the estuary cannot survive *without* human intervention. There have been several models of managing areas such as the Cook Inlet, through localized control in conjunction with federal regulation. It seems this may be the only way in which such areas can be maintained with the least amount of destruction (Lovecraft, 2004). Localized efforts in the Puget Sound have already resulted in recovery of 3,800 acres of habitat and the restoration of 1,309 acres of shellfish beds (Dodge, 2010). The natural process of runoff from rivers and lakes are an essential part of the system in the estuary in that it provides unique opportunities for ecological diversity. This, in turn, provides multiple opportunities for prey for the belugas.

**In today’s global environment, is the interconnection between these ecosystems potentially harmful to their ecological processes?** Cook Inlet, as unusual as it is, is the most inhabited section of Alaska. People living here rely on the waters for a variety of industrial and practical purposes. The human ecology of this area has defiantly proven harmful to the ecology of the Inlet that has the beluga whale at the top of its food chain. I have already shared the many ill effects that humans have had on the beluga population first, through overharvesting and most recently through industrialization and pollution. If drastic changes by humans are not implemented there is little chance the beluga population will survive which will change the balance in the food chain and drastically alter ecological process in the Cook Inlet.

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